

Things to know for final

What are the traits which characterize mammals in the American Museum of Natural History's vertebrate cladogram? Why doesn't this exhibit use the traditional definitions of mammals as "warm-blooded, covered with hair/fur, bear live young" etc.?

What does the technique of grouping organisms into *clades*, or the field of *cladistics*, refer to? How does a clade differ from a phylogeny?

Darwin's lines of evidence (5) for his theory of evolution. Be sure you know what each of these refers to.

What is the source of variation between organisms of the same species?

It's often said that the reason Darwin developed the theories of evolution and natural selection and Alfred Wallace did not is that Darwin traveled the world aboard the HMS Beagle, while Wallace studied one region of South America. Describe how Darwin's exposure to the geography of organisms became fundamental to the development of his ideas. Include examples in your answer.

What is a homologous structure? Give an example

What is the difference between the genotype and phenotype of an organism? Natural selection operates on which of these?

Suggest at least 2 different causes for mass extinctions in Earth history. What is a mass extinction? When are the 5 major mass extinctions? What role do mass extinctions play in evolution?

What is an "adaptive radiation"? When were at least two major adaptive radiations in earth history?

What does the concept of "pre-adaptation" refer to? Give an example.

The two theories for speciation are punctuated equilibrium and phyletic gradualism. Explain how these differ in their interpretation about how new species arise.

What role does "randomness" play in evolution?

What's wrong with the statement, "horses developed larger teeth covered with thicker enamel so they could eat grass" Rewrite this sentence so it is correct.

The finches of the Galapagos Islands have ancestors on mainland South America. Why did finches diversify into so many different species on the Galapagos Islands?

What is "convergent evolution"? Does it disprove Darwinian evolution?

What's the relationship between mass extinction and adaptive radiation?

Comparing our modern Earth to its historical state:

When was the last epeiric sea, or high stand of sea level that flooded the interior of the continents? Why is global sea level so low today?

Is the Earth hotter or colder or about the same temperature as it's been in the geologic past? What geologic time periods are examples of an "icebox Earth" and a "greenhouse Earth"?

What are at least two reasons that we know the Precambrian atmosphere lacked free oxygen? When (Ma?) did a fully oxygenated atmosphere develop?

What are the conditions necessary to produce life? If a scientist claims to have found "life" on another planet, what does that mean they recognize?

How did the Archean and Proterozoic worlds differ in terms of life forms, atmosphere, and behavior of the Earth's surface (plate tectonics)?

What are the Ediacaran, Tommotian, and Burgess Shale fauna and why is each significant?

Why is the Wopmay Orogeny significant? When did it occur?

What is the age of the oldest fossil? What is it?

The earliest forms of life were prokaryotes. What does this mean? Are prokaryotes still around on earth?

What is a stromatolite? When were they extremely abundant on Earth and how are they related to evolution of the atmosphere?

What happens to the level of atmospheric carbon dioxide when: (1) burial rates of plant material increase? (2) mountains are uplifted? (3) thermohaline circulation collapses and the deep ocean becomes anoxic? (4) increased sedimentation rates of pelagic carbonate organisms? How do carbon isotopes help us to understand what might be happening in the carbon cycle? For example, if carbon 13 ratios increase in marine shells, what might this mean about burial rates?

The entire geologic time scale and ages: 1) the bases and tops of the Archean, Proterozoic and Phanerozoic Eons; (2) the periods of the Phanerozoic

What did the Miller and Urey experiment model? What are the 3 key components of this model (i.e. what 3 things do you need to have to get "results"?)

Can you examine stratigraphic columns and determine the direction towards the basin and towards land? Can you hypothesize if the adjacent land mass is mountainous or not?

Can you examine a geologic map and determine the relative age of a fault?

Can you examine a geologic map and determine if you are looking at a syncline or anticline?